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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/912,595	07/26/2001	Masafumi Hashimoto	GNE441A	7183

466 7590 12/17/2003

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EXAMINER	
DONG, DALEI	
ART UNIT	**PAPER NUMBER**
2875	

DATE MAILED: 12/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/912,595	HASHIMOTO ET AL.	
	Examiner	Art Unit	
	Dalei Dong	2875	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 November 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 09/912,595.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-2, 4, and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,656,893 to Shino in view of U.S. Patent No. 5,821,685 to Peterson.

Regarding to claim 1-2, 4, and 7-9, Shino discloses in Figure 11b, "an AC-type PDP 200 includes a first glass substrate 203 and a second glass substrate 208 opposed to each other. The first glass substrate 203 and the second glass substrate 208 form an outer casing of the AC-type PDP 200 together. On an inner face of the first glass substrate 203, a first electrode group including a plurality of comb-like scanning electrodes having teeth (first discharge electrode) 201 and a plurality of comb-like sustaining electrodes having teeth (second discharge electrodes) 202 is located. A dielectric layer 204 is located on the first glass substrate 203, covering the first electrode group, and a protection layer 205 is located on the dielectric layer 204. On an inner face of the second glass substrate 208, an second electrode group including a plurality of data electrode (third discharge electrode; also referred to as "address electrodes") 207 is located. The data electrodes 207 are opposed to the protection layer 205 with discharge space 206 interposed therebetween" (column 17, line 59-67 to column 18, line 1-9).

Shino also discloses in Figure 11A, "the scanning electrodes 201a through 201n (only 201a and 201b are shown here) and the sustaining electrodes 202a through 202n (only 202a and 202b are shown here) are provided alternately. Adjacent scanning electrode and sustaining electrode (for example, 201a and 202a) are located opposed to each other with a small gap interposed therebetween so that teeth thereof are in engagement with each other" (column 18, line 10-17).

Shino further discloses in Figures 13A and 13B, "AC-type PDP 250, three types of phosphor layers R, G and B for emitting light of red, green and blue respectively are located on the inner face of the second glass substrate 208. The AC-type PDP 250 has the same structure as that of the AC-type PDP 200 except for the phosphor layers R, G and B. The phosphor layers R, G and B are respectively in substantial positional correspondence with three discharge areas S in one pixel area P (FIG. 13A) which is substantially square, and are excited to emit light upon receiving ultraviolet rays generated by discharge in the areas S" (column 20, line 11-21).

However, Shino does not disclose the phosphor layer continuously covers an entirely of the inner space overlying the linear parts of the first and second electrodes. Peterson teaches in Figure 5, "Face plate 60 is made from a transparent UV-transmitting material, such as glass. To lessen the scattering of light, face plate 60 can be made from a directional material such as a fiber optic. Within the interspace region, and on back plate 64, is disposed an electron source 66, which, in this embodiment, includes a cold cathode field emitter having a plurality of field emission devices 68. Disposed on the inner surface of face plate 60, are a plurality of anode conductors 62, which are made

from a transparent, conductive material and are deposited on face plate 60 by any of a number of deposition techniques known in the art. A layer 72 of electron-excitable UV-emitting material is disposed on anode conductors 62. This configuration allows layer 72 to function also as a thermal heat sink with face plate 60. FEDs are driven at current densities which generate appreciable heat within their phosphors; low heat dissipation out of the phosphor can have adverse effects on phosphor performance. Thus, this configuration is beneficial since it enhances the conduction of heat away from layer 72. Layer 72 is formed by sol-gel techniques and liquid film deposition methods, as described with reference to FIG. 4 and the description of layer 52. In this embodiment of a FED in accordance with the present invention, layer 72 is spaced from a layer 70, which includes a UV-excitable light-emitting phosphor. A list of such phosphors is set forth with reference to FIG. 1, in the description of light-emitting particles 10. In other embodiments, layer 70 is fabricated via sol-gel techniques. Layer 70 is formed on the outer surface of face plate 60 and is enclosed by a protective film 74, such as a silica barrier layer, which protects the light-emitting phosphor from exposure to moisture in the air. In this particular embodiment, layer 72 includes ZnO.Ga.sub.2 O.sub.3 :Gd formed by sol-gel techniques as described with reference to FIG. 2 and deposited as a film by any of several liquid film deposition techniques, such as spin-casting, dipping, vapor phase deposition, and the like. In this embodiment, electrons emitted by electron source 66 are received by layer 72 which is thereby excited to emit UV radiation, which, in turn, travels through transparent anode conductors 62 and transparent face plate 60 to be received by layer 70 which is thereby excited to emit visible light having a predetermined color. A

sol-gel layer, such as layer 72 of FED 400, also provides improved mechanical ruggedness over prior art powdered phosphors which are adhered to the inner surface of a face plate of a display. This improved mechanical stability is desirable when mechanical standoff structures, or spacers, are incorporated between the face plate and back plate of a display, so that minor mechanical disturbances during the placement and fixation of such spacers do not remove, or otherwise adversely affect the patterning of, the phosphor. Because layer 70 is disposed on the outer surface of face plate 60, the UV-excitable light-emitting phosphor can be deposited subsequent to the high-temperature, packaging steps included in the fabrication of FED 400, so that UV-excitable light-emitting phosphors having low temperature tolerances are employable. The configuration also allows the use of organic UV-excitable light-emitting phosphors in layer 70.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have apply the sol-gel phosphor layer to continuously covers an entirety of the inner space of the front substrate of Shino in order to function as a thermal heat sink to enhance the conduction of heat away from the phosphor layer and further improves mechanical ruggedness and thus prolong the lifetime of the plasma display

3. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,656,893 to Shino in view of U.S. Patent No. 5,821,685 to Peterson in further view of U.S. Patent No. 5,801,483 to Watanabe.

Regarding to claim 5, Shino discloses a flat-type light-emitting device comprising an envelope, a phosphor layer, first and second electrode including linear parts and

finally the envelope allows the visible light to penetrate through the envelope to the outside.

However, Shino does not disclose the phosphor layer continuously covers an entirely of the inner space overlying the linear parts of the first and second electrodes and a photocatalyst layer formed on an outer surface of the envelope. Peterson teaches the phosphor layer continuously covers an entirely of the inner space overlying the linear parts of the first and second electrodes; however, fails to teach a photocatalyst layer formed on an outer surface of the envelope.

Watanabe teaches "international laid open patent application No. WO 94/11092 and Japanese laid open patent application No. 7-11104 disclose an air treating method using a photocatalyst under interior illumination. According to those applications, the photo catalytic material is excited by ultraviolet ration from a conventional fluorescent lamp" (column 1, line 45-50).

It would have been obvious to one of ordinary skills in the art at the time the invention was made to utilize the photocatalyst material of Watanabe on the outer surface of the envelope of Shino and the phosphor layer of Peterson continuously covers an entirely of the inner space overlying the linear parts of the first and second electrodes on the top substrate of Shino in order to have an even or uniform distribution of the light intensity without luminance degradation and provide stable discharge paths between all the adjoining linear parts of electrodes in the inner space of the envelope.

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,656,893 to Shino in view of U.S. Patent No. 5,821,685 to Peterson in further view of U.S. Patent No. 5,185,554 to Nomura.

Regarding to claim 6, Shino discloses a flat-type light-emitting device comprising an envelope, a phosphor layer, first and second electrode including linear parts and finally the envelope allows the visible light to penetrate through the envelope to the outside.

However, Shino does not disclose the phosphor layer continuously covers an entirely of the inner space overlying the linear parts of the first and second electrodes and the relationship of the distance between electrodes and the vertical distance of the envelope. Peterson teaches the phosphor layer continuously covers an entirely of the inner space overlying the linear parts of the first and second electrodes; however, fails to teach the relationship of the distance between electrodes and the vertical distances of the envelope.

Nomura teaches "for the modulating electrode in the present embodiment, a nickel material is used and a group of modulating electrodes are prepared with a width of 106 mm and a pitch of 2 mm each" (column 7, line 21-24).

Nomura also teaches "a face plate (like the face plate 10 as shown in Figure 11) having a fluorescent member (an image forming member) is provided at 5 mm distance from the rear plate of the electron-beam generator prepared according to the process described above" (column 8, line 8-13).

It is old and well known in the art of Paschen's Law whose relates the voltage at which a gas breaks down into a plasma, the so called spark or firing voltage, to the product of the pressure of the gas, p (in mm Hg), times the distance, d (in cm), between the electrode.

It would have been obvious to one of ordinary skills in the art at the time the invention was made to utilize the electrode configuration and the separation of the two face plates of Nomura for the light-emitting device of Shino and add the phosphor layer of Peterson continuously covers an entirely of the inner space overlying the linear parts of the first and second electrodes on the top substrate of Shino; further the electrode configuration can be revised according to the Paschen's Law with the desired design choice in order to have an even or uniform distribution of the light intensity without luminance degradation and provide stable discharge paths between all the adjoining linear parts of electrodes in the inner space of the envelope.

5. Claims 10, 12, 15-18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,656,893 to Shino in view of U.S. Patent No. 5,821,685 to Peterson in further view of U.S. Patent No. 5,508,584 to Tsai.

Regarding to claims 10, 12, 15-18 and 20, Shino discloses a flat-type light-emitting device comprising an envelope, a phosphor layer, first and second electrode including linear parts and finally the envelope allows the visible light to penetrate through the envelope to the outside.

However, Shino fails to disclose the phosphor layer continuously covers an entirely of the inner space overlying the linear parts of the first and second electrodes and the first and second electrodes having linearly extended first and second connection parts and plural first and second fingers. Peterson teaches the phosphor layer continuously covers an entirely of the inner space overlying the linear parts of the first and second electrodes; however, fails to teach the first and second electrodes having linearly extended first and second connection parts and plural first and second fingers.

Tsai teaches in Figure 7, "three conductive lines 82, 83 and 84. Conductive lines 82 and 84 have a comb-like shape while line 83 has an interweaving shape, wherein all three lines are interlocking as shown schematically in Figure 7. These lines are formed to a width of between about 30 and 100 micrometers" (column 6, line 1-5).

It would have been obvious to one of ordinary skills in the art at the time the invention was made to utilize the detailed layout of electrodes of Tsai for the light-emitting device of Shino and have the phosphor layer of Peterson continuously covers an entirely of the inner space overlying the linear parts of the first and second electrodes on top substrate of Shino in order to decrease spot size, increase throughput and reduce power consumption and further improve focus in all directions.

6. Claims 11, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,656,893 to Shino in view of U.S. Patent No. 5,821,685 to Peterson in further view of U.S. Patent No. 5,508,584 to Tsai yet in further view of U.S. Patent No. 5,185,554 to Nomura.

Regarding to claim 6, Shino discloses a flat-type light-emitting device comprising an envelope, a phosphor layer, first and second electrode including linear parts and finally the envelope allows the visible light to penetrate through the envelope to the outside.

However, Shino does not disclose the phosphor layer continuously covers an entirely of the inner space overlying the linear parts of the first and second electrodes and the first and second electrodes having linearly extended first and second connection parts and plural first and second fingers and the relationship of the distance between electrodes and the vertical distance of the envelope. Peterson teaches the phosphor layer continuously covers an entirely of the inner space overlying the linear parts of the first and second electrodes; however, fails to teach the first and second electrodes having linearly extended first and second connection parts and plural first and second fingers and the relationship of the distance between electrodes and the vertical distance of the envelope.

Tsai teaches first and second electrodes having linearly extended first and second connection parts and plural first and second fingers, however, Tsai does not teach the distance between electrodes and the vertical distance of the envelope.

Nomura teaches "for the modulating electrode in the present embodiment, a nickel material is used and a group of modulating electrodes are prepared with a width of 106 mm and a pitch of 2 mm each" (column 7, line 21-24).

Nomura also teaches "a face plate (like the face plate 10 as shown in Figure 11) having a fluorescent member (an image forming member) is provided at 5 mm distance

from the rear plate of the electron-beam generator prepared according to the process described above" (column 8, line 8-13).

It is old and well known in the art of Paschen's Law whose relates the voltage at which a gas breaks down into a plasma, the so called spark or firing voltage, to the product of the pressure of the gas, p (in mm Hg), times the distance, d (in cm), between the electrode.

It would have been obvious to one of ordinary skills in the art at the time the invention was made to utilize the electrode configuration of Tsai with the separation of the two face plates of Nomura for the light-emitting device of Shino and add the phosphor layer of Peterson continuously covers an entirely of the inner space overlying the linear parts of the first and second electrodes on the top substrate of Shino; further the electrode configuration can be revised according to the Paschen's Law with the desired design choice in order to have an even or uniform distribution of the light intensity without luminance degradation and provide stable discharge paths between all the adjoining linear parts of electrodes in the inner space of the envelope.

7. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,656,893 to Shino in view of U.S. Patent No. 5,821,685 to Peterson in further view of U.S. Patent No. 5,508,584 to Tsai and yet in further view of U.S. Patent No. 5,801,483 to Watanabe.

Regarding to claim 19, Shino discloses a flat-type light-emitting device comprising an envelope, a phosphor layer, first and second electrode including linear

parts and finally the envelope allows the visible light to penetrate through the envelope to the outside.

However, Shino does not disclose the phosphor layer continuously covers an entirely of the inner space overlying the plurality linear parts of the first and second electrodes and a photocatalyst layer formed on an outer surface of the envelope. Peterson teaches the phosphor layer continuously covers an entirely of the inner space overlying the linear parts of the first and second electrodes; however, fails to teach a plurality of linear parts of the first and second electrodes and photocatalyst layer formed on an outer surface of the envelope. Tsai teaches a plurality of linear parts of the first and second electrodes; however fails to teach photocatalyst layer formed on an outer surface of the envelope.

Watanabe teaches "international laid open patent application No. WO 94/11092 and Japanese laid open patent application No. 7-11104 disclose an air treating method using a photocatalyst under interior illumination. According to those applications, the photo catalytic material is excited by ultraviolet ration from a conventional fluorescent lamp" (column 1, line 45-50).

It would have been obvious to one of ordinary skills in the art at the time the invention was made to utilize the photocatalyst material of Watanabe on the outer surface of the envelope of Shino and the phosphor layer of Peterson continuously covers plurality of linear parts of first and second electrodes of Tsai entirely of the inner space overlying the linear parts of the first and second electrodes on the top substrate of Shino in order to have an even or uniform distribution of the light intensity without luminance degradation and provide

stable discharge paths between all the adjoining linear parts of electrodes in the inner space of the envelope and further decrease spot size, increase throughput and reduce power consumption and further improve focus in all directions.

Response to Arguments

8. Applicant's arguments filed November 14, 2003 have been fully considered but they are not persuasive.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Shino reference and Petersen reference both utilize emitted ions to excited the phosphor layer in order to produce the desired light. Also, Petersen teaches the use of continuously phosphor layer covering *both* the inner of the device and the outer device and nowhere in the Petersen reference does it mention the use of inner and outer phosphor layers separately, therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the inner and outer phosphor layer of Petersen for the display device of Shino reference and not separate the phosphor layers. Further, by merely changing the type of phosphor material will not change the function of the device

and it is old and well known in the art to utilize different phosphor layers in order to emit the desired color for the device, therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have simply change the phosphor in accordance with the color desired by the viewer.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (703)308-2870 (after January 14, (571)272-2370). The examiner can normally be reached on 8 A.M. to 5 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (703)305-4939 (after January 14, (571) 272-2378).

The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

D.D.
December 10, 2003

Sandra O'Shea
Supervisory Patent Examiner
Technology Center 2800